



SEQLIST.TXT
SEQUENCE LISTING



<110> Griffiths, Steven
Ritchie, Rachael Jane

<120> Nucleic Acid And Amino Acid Sequences Of
Infectious Salmon Anaemia Virus And Their Uses As Vaccines

<130> H-32318B

<140> US 10/734,782

<141> 2003-12-12

<150> US 10/049,086

<151> 2002-02-06

<150> PCT/GB00/02976

<151> 2000-08-07

<150> GB 0006674.6

<151> 2000-03-21

<150> GB 0005848.7

<151> 2000-03-11

<150> GB 9918588.6

<151> 1999-08-07

<160> 10

<170> FastSEQ for windows Version 4.0

<210> 1

<211> 1821

<212> DNA

<213> Infectious Salmon Anaemia Virus

<400> 1

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cggagaacag	gagaagaaga	gaccagcaac	aatagacgaa	gtgagaaccg	caggagaaag	960
gtttgaacag	agtgttaaac	cgaaaaccca	aagatatgga	aggttatcag	acaaatggat	1020
ggagcttgaa	aagtttatct	ttactgcaag	caaaacagaa	gtggatactt	tcctttctgt	1080
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SEQLIST.TXT

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<210> 2

<211> 578

<212> PRT

<213> Infectious Salmon Anaemia Virus

<400> 2

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His Leu Tyr Met Cys Val Ala Phe Cys Asp Gln His Lys Thr Thr Gly
 35     40     45
Asp Glu Ser Arg Phe Thr Asn Leu Glu Leu Leu Asp Gln Asp Glu Ala
 50     55     60
Leu Gly Ala Gln Arg Ala Phe Glu Ala Lys His Gly Ile Lys Gly Gly
 65     70     75     80
Ser Leu Gly Asp Val Leu Asp His Glu Leu Lys Lys Val Ile Glu Phe
 85     90     95
Thr Phe Thr Ser Gly Ser Leu Tyr Ile Ala Glu Gln Arg Lys Arg Lys
100    105    110
Thr Gln Ala Asp Ser Ile Ile Val Cys Val Ser Glu Gly Leu Asn Asp
115    120    125
Phe Ser Val Ser His Gly Val Leu Asp Met Gly Leu Val Glu Thr Gly
130    135    140
Val Asn Ala Val Arg Asp Phe Cys Thr Gln Asn Gly Ile Pro Met Lys
145    150    155    160
Ile Asn Gln Val Gly Ser Thr Arg Thr Pro Thr Pro Ile Ser Thr Cys
165    170    175
Lys Ile Ser Glu Gln Ile Thr Arg Gln Ile Asn Ser Thr Ile Thr Glu
180    185    190
Arg Lys Met Glu Thr Val Leu Ala Ala Ile Ala Ile Lys Pro Glu Leu
195    200    205
Lys Leu Thr Gln Lys Gly Cys Arg Pro Cys Lys Glu Leu Glu Asp Glu
210    215    220
Asn Ile Leu Trp Met Asp Pro Gln Phe Cys Glu Ile Asp Glu Ser Phe
225    230    235    240
Pro Tyr Arg Gly Gly Pro Tyr Gly Asn Phe Leu Gln Glu Leu Leu Leu
245    250    255
Thr Thr Asn Asp Val Glu Thr Asn Gly Lys Asp Arg Glu Glu Val Val
260    265    270
Lys Lys Ile Leu Asp Asn Lys Ala Phe Thr Val Glu Ser Gly Glu Cys
275    280    285
Ile Ile Thr Leu Pro Asp Lys Met Thr Cys Phe Gly Glu Gln Glu Lys
290    295    300
Lys Arg Pro Ala Thr Ile Asp Glu Val Arg Thr Ala Gly Glu Arg Phe
305    310    315    320

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SEQLIST.TXT

Glu Gln Ser Val Lys Pro Lys Thr Gln Arg Tyr Gly Arg Leu Ser Asp
 325 330 335
 Lys Trp Met Glu Leu Glu Lys Phe Ile Phe Thr Ala Ser Lys Thr Glu
 340 345 350
 Val Asp Thr Phe Leu Ser Val Gly Thr Glu Arg Leu Glu Ser Val Gly
 355 360 365
 Val Cys Val Gly Ala Leu His Arg Ala Thr Thr Thr Arg Ile Ile Arg
 370 375 380
 Pro Met Ile Gln Gly Gly Lys Cys Trp Gly Met Met Phe Lys Thr Lys
 385 390 395 400
 Ser Lys Met Gly Asp Thr Arg Lys Glu Gly Tyr Cys His Ala Ile Ile
 405 410 415
 Phe Gly Lys Gly Glu Asp Lys Ser Gly Gln Asn Lys Met Thr Met Met
 420 425 430
 Gly Lys Thr Val His Trp His Leu Arg Val Val Lys Ser Lys Gly Asp
 435 440 445
 Trp Met Ala Gln Gln Leu Cys Ala Asn Lys Ser Arg Ile Trp Glu His
 450 455 460
 Asp Pro Glu Leu Val Thr Glu Gly Val Thr Val Leu Met Thr Pro Phe
 465 470 475 480
 Ser Gln Lys Ile Ala Thr Ile Ser Arg Trp Arg Ala Met Arg Leu Asp
 485 490 495
 Ser Met Phe His Val Ser Ser Ala Trp His His Ser Pro Ala Cys Glu
 500 505 510
 Ala Ala Ser Ala Met Leu Arg Lys Phe Val Glu Ile Val His Ala Ile
 515 520 525
 Asn Gln Lys Arg Asp Trp Gly Val Val Gly Ser Met Glu Asp Met Val
 530 535 540
 Lys Glu Val Glu Glu Ile Gly Glu His Leu Gln Thr Ala Cys Asp Phe
 545 550 555 560
 Arg Val Tyr Asn Met Cys Lys Ala Leu Ile Gln Lys Ile Ala Val Ser
 565 570 575
 Thr Gln

<210> 3
 <211> 2018
 <212> DNA
 <213> Infectious Salmon Anaemia Virus

<400> 3
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 ctaaaagtgg cattaagatc tcctacagag aggatcgagg aacatcactt ctccaaaagg 180
 cattcgccgg gacagaagat gaattctggg tggagttaga tcaagatgtc tacgttgaca 240
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SEQLIST.TXT

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tggaactctt atgtacaagc ttcctgattg accctccaag aactaccaa tgcttcattc 1200
cacctatttc cagtctcatg atgtacatcc aagaaggcaa ctctgtactg gcaatggatt 1260
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acgaggacga cgaggaagag gaagacattg acatttagag tgacaattat gtaactttct 1920
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<210> 4

<211> 616

<212> PRT

<213> Infectious Salmon Anaemia Virus

<400> 4

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          20          25          30
Tyr Arg Glu Asp Arg Gly Thr Ser Leu Leu Gln Lys Ala Phe Ala Gly
          35          40          45
Thr Glu Asp Glu Phe Trp Val Glu Leu Asp Gln Asp Val Tyr Val Asp
          50          55          60
Lys Lys Ile Arg Lys Phe Leu Glu Glu Glu Lys Met Lys Asp Met Ser
 65          70          75          80
Thr Arg Val Ser Gly Ala Val Ala Ala Ala Ile Glu Arg Ser Val Glu
          85          90          95
Phe Asp Asn Phe Ser Lys Glu Ala Ala Ala Asn Ile Glu Met Ala Gly
          100          105          110
Val Asp Asp Glu Glu Ala Gly Gly Ser Gly Leu Val Asp Asn Arg Arg
          115          120          125
Lys Asn Lys Gly Val Ser Asn Met Ala Tyr Asn Leu Ser Leu Phe Ile
 130          135          140
Gly Met Val Phe Pro Ala Leu Thr Thr Phe Phe Ser Ala Ile Leu Ser
 145          150          155          160
Glu Gly Glu Met Ser Ile Trp Gln Asn Gly Gln Ala Ile Ile Arg Ile
          165          170          175
Leu Ala Leu Ala Asp Glu Asp Gly Lys Arg Gln Thr Arg Thr Gly Gly
          180          185          190
Gln Arg Val Asp Met Ala Asp Val Thr Lys Leu Asn Val Val Thr Ala
          195          200          205
Asn Gly Lys Val Lys Gln Val Glu Val Asn Leu Asn Asp Leu Lys Ala
 210          215          220
Ala Phe Arg Gln Ser Arg Pro Lys Arg Ser Asp Tyr Arg Lys Gly Gln
 225          230          235          240
Gly Ser Lys Ala Thr Glu Ser Ser Ile Ser Asn Gln Cys Met Ala Leu
          245          250          255
Ile Met Lys Ser Val Leu Ser Ala Asp Gln Leu Phe Ala Pro Gly Val
          260          265          270
Lys Met Met Arg Thr Asn Gly Phe Asn Ala Ser Tyr Thr Thr Leu Ala

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SEQLIST.TXT

Glu	Gly	275	Ala	Asn	Ile	Pro	Ser	280	Lys	Tyr	Leu	Arg	His	285	Met	Arg	Asn	Cys
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305					310					315					320			
Pro	Glu	Gly	Ala	Lys	Ser	Lys	Ile	Phe	Ser	Ile	Ile	Gln	Lys	Lys	Val			
				325					330					335				
Arg	Gly	Arg	Cys	Arg	Thr	Glu	Glu	Gln	Arg	Leu	Leu	Thr	Ser	Ala	Leu			
			340					345					350					
Lys	Ile	Ser	Asp	Gly	Glu	Asn	Lys	Phe	Gln	Arg	Ile	Met	Asp	Thr	Leu			
		355					360					365						
Cys	Thr	Ser	Phe	Leu	Ile	Asp	Pro	Pro	Arg	Thr	Thr	Lys	Cys	Phe	Ile			
	370					375						380						
Pro	Pro	Ile	Ser	Ser	Leu	Met	Met	Tyr	Ile	Gln	Glu	Gly	Asn	Ser	Val			
385					390					395					400			
Leu	Ala	Met	Asp	Phe	Met	Lys	Asn	Gly	Glu	Asp	Ala	Cys	Lys	Ile	Cys			
				405					410					415				
Arg	Glu	Ala	Lys	Leu	Lys	Val	Gly	Val	Asn	Ser	Thr	Phe	Thr	Met	Ser			
			420					425					430					
Val	Ala	Arg	Thr	Cys	Val	Ala	Val	Ser	Met	Val	Ala	Thr	Ala	Phe	Cys			
	435						440					445						
Ser	Ala	Asp	Ile	Ile	Glu	Asn	Ala	Val	Pro	Gly	Ser	Glu	Arg	Tyr	Arg			
	450					455					460							
Ser	Asn	Ile	Lys	Ala	Asn	Thr	Thr	Lys	Pro	Lys	Lys	Asp	Ser	Thr	Tyr			
	465				470					475					480			
Thr	Ile	Gln	Gly	Leu	Arg	Leu	Ser	Asn	Val	Arg	Tyr	Glu	Ala	Arg	Pro			
			485					490						495				
Glu	Thr	Ser	Gln	Ser	Asn	Thr	Asp	Arg	Ser	Trp	Gln	Val	Asn	Val	Thr			
			500					505					510					
Asp	Ser	Phe	Gly	Gly	Leu	Ala	Val	Phe	Asn	Gln	Gly	Ala	Ile	Arg	Glu			
		515					520					525						
Met	Leu	Gly	Asp	Gly	Thr	Ser	Glu	Thr	Thr	Ser	Val	Asn	Val	Arg	Ala			
	530					535					540							
Leu	Val	Lys	Arg	Ile	Leu	Lys	Ser	Ala	Ser	Glu	Arg	Ser	Ala	Arg	Ala			
	545				550					555					560			
Val	Lys	Thr	Phe	Met	Val	Gly	Glu	Gln	Gly	Lys	Ser	Ala	Ile	Val	Ile			
			565					570					575					
Ser	Gly	Val	Gly	Leu	Phe	Ser	Ile	Asp	Phe	Glu	Gly	Val	Glu	Glu	Ala			
			580					585					590					
Glu	Arg	Ile	Thr	Asp	Met	Thr	Pro	Glu	Ile	Glu	Phe	Asp	Glu	Asp	Asp			
		595					600					605						
Glu	Glu	Glu	Glu	Asp	Ile	Asp	Ile											
	610					615												

<210> 5

<211> 1050

<212> DNA

<213> Infectious Salmon Anaemia Virus

<400> 5

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aagttcagtg	acaaggacga	gatgcaggga	tactatgagg	gatgtctaga	ggcttctact	420
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SEQLIST.TXT

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aatgagagag ctggagttga gcttagggct ggacttcact tcagaatgtg attggttgaa 780
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<210> 6
 <211> 256
 <212> PRT
 <213> Infectious Salmon Anaemia Virus

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<400> 6
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20 25 30
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35 40 45
Asp Phe Pro Ser Cys Pro Leu Gly Asn Gly Asp Asp Phe Cys Leu Ser
50 55 60
Leu Ala Leu Ser Thr Met Arg Trp Ser Gly Met Thr Lys Arg Asn Asn
65 70 75 80
Phe Met Asp Arg Phe Ile Gly Ser Phe Val His Cys Thr Pro Val Met
85 90 95
Ile Trp Ser Tyr Gly Asn Leu Ser Lys Lys Ser His His Lys Met Val
100 105 110
Cys His Thr Cys Pro Asp Glu Tyr Lys Phe Ser Asp Lys Asp Glu Met
115 120 125
Gln Gly Tyr Tyr Glu Gly Cys Leu Glu Ala Ser Thr Asp Ile Phe Leu
130 135 140
Asp Glu Leu Ala Thr Val Val Thr Gly Gly Phe Phe Pro Val Gly Leu
145 150 155 160
Lys Gly Ser Trp Gly Gly Trp Tyr Leu Lys Tyr Val Arg Tyr Ala Gly
165 170 175
Pro Leu Ala Gly Ser Ser Gly Phe Ile Val Asn Gln Arg Phe Tyr Asp
180 185 190
Arg Ala Gln Asn Lys Thr Gly Ser Arg Val Val Ser Met Val Glu Met
195 200 205
Asp Gly Asp Gly Leu Ser Phe Ile Tyr Glu Lys Pro Ser Val Tyr His
210 215 220
Ser Asp Gly Cys Thr Gly Ser Ala Ala Arg Phe Trp Lys Arg Asp His
225 230 235 240
Asn Glu Arg Ala Gly Val Glu Leu Arg Ala Gly Leu His Phe Arg Met
245 250 255

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<210> 7
 <211> 140
 <212> PRT
 <213> Infectious Salmon Anaemia Virus

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<400> 7
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1 5 10 15

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SEQLIST.TXT

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Val Val Phe Ser Leu Thr Glu Thr Gly Ser Cys Val Ser Phe Tyr Gly
      20      25      30
Asp Asp Glu Pro Gly Gly Phe Phe Pro Val Gly Leu Lys Gly Ser Trp
      35      40      45
Gly Gly Ser Tyr Leu Lys Tyr Val Arg Tyr Ala Gly Pro Leu Ala Gly
      50      55      60
Ser Ser Gly Phe Ile Val Asn Gln Arg Phe Tyr Asp Arg Ala Gln Asn
      65      70      75      80
Lys Thr Gly Ser Arg Val Val Ser Met Val Glu Met Asp Gly Asp Gly
      85      90      95
Leu Ser Phe Ile Tyr Glu Lys Pro Ser Val Tyr His Ser Asp Gly Cys
      100      105      110
Thr Gly Ser Ala Ala Arg Phe Trp Lys Arg Asp His Asn Glu Arg Ala
      115      120      125
Gly Val Glu Leu Arg Ala Gly Leu His Phe Arg Met
      130      135      140

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<210> 8
 <211> 146
 <212> PRT
 <213> Infectious Salmon Anaemia Virus

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<400> 8
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      20      25      30
Leu Leu Arg Asp Gln Val Asp Ser Leu Ser Ile Asn Asp Ser Thr Thr
      35      40      45
Glu Pro Lys Thr Arg Leu Asp Pro Gly Leu Tyr Pro Trp Leu Lys Trp
      50      55      60
Thr Glu Thr Ala Tyr Arg Ser Ser Thr Arg Ser Leu Ala Ser Thr Ile
      65      70      75      80
Val Met Gly Ala Leu Gly Gln Gln Arg Gly Ser Gly Asn Gly Ile Thr
      85      90      95
Met Arg Glu Leu Glu Leu Ser Leu Gly Leu Asp Phe Thr Ser Glu Cys
      100      105      110
Asp Trp Leu Lys Thr Cys Tyr Val Asn Lys Asn Phe Val Phe Leu Ser
      115      120      125
Glu Lys Glu Ile Ala Val Asn Met Glu Val Glu Lys Phe Ile Cys Asn
      130      135      140
Glu Asn
145

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<210> 9
 <211> 1033
 <212> DNA
 <213> Infectious Salmon Anaemia Virus

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<400> 9
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ccaacctact acaaagtata ggattctata cattgtgata aacgactgca ctgagggccc 240
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gggagcatgt cgaggagatg taagagtgac accaaccttc gtgggagcag ctgagcttgg 360
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SEQLIST.TXT

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aggaacaaag aacaaatgtg tcatacttag atcttctagc aatgctcctt tgtgtacaca 660
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gggagtggca ggt                                     1033

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<210> 10

<211> 344

<212> PRT

<213> Infectious Salmon Anaemia Virus

<400> 10

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Ser Arg Leu Cys Leu Arg Asn His Pro Asp Thr Thr Trp Ile Gly Asp
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Ser Arg Ser Asp Gln Ser Arg Val Asn Gln Gln Ser Leu Asp Leu Val
20     25     30
Thr Asn Phe Lys Gly Ile Leu Gln Ala Lys Asn Gly Asn Gly Leu Met
35     40     45
Lys Gln Met Ser Gly Arg Phe Pro Ser Asp Trp Tyr Gln Pro Thr Thr
50     55     60
Lys Tyr Arg Ile Leu Tyr Ile Gly Thr Asn Asp Cys Thr Glu Gly Pro
65     70     75     80
Asn Asp Val Ile Ile Pro Thr Ser Met Thr Leu Asp Asn Val Ala Arg
85     90     95
Asp Leu Tyr Leu Gly Ala Cys Arg Gly Asp Val Arg Val Thr Pro Thr
100    105    110
Phe Val Gly Ala Ala Glu Leu Gly Leu Ile Gly Arg Thr Asp Ala Leu
115    120    125
Thr Gly Phe Ser Val Lys Val Leu Thr Phe Asn Asn Pro Thr Ile Val
130    135    140
Val Val Gly Leu Asn Gly Met Ser Gly Ile Tyr Lys Val Cys Ile Ala
145    150    155    160
Ala Ser Ser Gly Asn Val Gly Gly Val Asn Leu Val Asn Gly Cys Gly
165    170    175
Tyr Phe Ser Ala Pro Leu Arg Phe Asp Asn Phe Lys Gly Gln Ile Tyr
180    185    190
Val Ser Asp Thr Phe Glu Val Arg Gly Thr Lys Asn Lys Cys Val Ile
195    200    205
Leu Arg Ser Ser Ser Asn Ala Pro Leu Cys Thr His Ile Lys Arg Asn
210    215    220
Ile Glu Leu Asp Glu Tyr Val Asp Thr Pro Asn Thr Gly Gly Val Tyr
225    230    235    240
Pro Ser Asp Gly Phe Asp Ser Leu His Gly Ser Ala Ser Ile Arg Thr
245    250    255
Phe Leu Thr Glu Ala Leu Thr Cys Pro Gly Val Asp Trp Asp Arg Ile
260    265    270
Asp Ala Ala Ser Cys Glu Tyr Asp Ser Cys Pro Lys Leu Val Lys Glu
275    280    285
Phe Asp Gln Thr Gly Leu Gly Asn Thr Asp Thr Gln Ile Met Arg Glu
290    295    300
Leu Glu Ala Gln Lys Glu Met Ile Gly Lys Leu Gly Arg Asn Ile Thr
305    310    315    320
Asp Val Asn Asn Arg Val Asp Ala Ile Pro Pro Gln Leu Ser Asn Ile

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Phe Ile Ser Met Gly val Ala Gly
340

SEQLIST.TXT
330

335